

Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Withdrawn): A method of forming a layer of a hard, dense, and abrasion and corrosion resistant material on a surface of a substrate, comprising sequential steps of:
 - (a) providing a substrate having at least one surface adapted for deposition thereon;
 - (b) forming on said at least one surface of said substrate a layer of undoped tetrahedral amorphous carbon (ta-C) having a high mass density of carbon (C) atoms greater than about 2.5 gms/cm^3 ; and
 - (c) forming on said layer of undoped ta-C a layer of nitrogen-doped tetrahedral amorphous carbon (ta-C:N) having a high mass density of carbon (C) atoms greater than 2.0 gms/cm^3 .
2. (Withdrawn): The method according to claim 1, wherein:

step (c) comprises forming said nitrogen-doped layer of ta-C:N with a nitrogen-to-carbon atom ratio (N/C) of up to about 0.3.
3. (Withdrawn): The method according to claim 2, wherein:

step (b) comprises forming said layer of undoped ta-C by means of a filtered cathodic arc deposition (FCAD) process performed in a vacuum chamber and utilizing an undoped carbon cathode; and

step (c) comprises forming said nitrogen-doped layer of ta-C:N by means of a FCAD process utilizing said undoped carbon cathode and a nitrogen-containing gas introduced to said vacuum chamber.

4. (Withdrawn): The method according to claim 3, wherein:
step (c) comprises introducing nitrogen gas (N_2) to said vacuum chamber at a flow rate up to about 100 sccm.
5. (Withdrawn): The method according to claim 3, wherein:
step (a) comprises providing a disk-shaped substrate including a stacked plurality of thin film layers on at least one surface thereof, said layers including at least one magnetic or magneto-optical (MO) recording layer; and
step (b) comprises forming said layer of undoped ta-C on an exposed surface of an outermost layer of said stacked plurality of layers.
6. (Withdrawn): The method according to claim 5, wherein:
step (b) comprises forming said layer of undoped ta-C at a thickness from about 1 to about 100 Å; and
step (c) comprises forming said layer of nitrogen-doped ta-C:N at a thickness from about 1 to about 50 Å.
7. (Withdrawn): The method according to claim 6, wherein:
step (b) comprises forming said layer of undoped ta-C at a thickness from about 5 to about 30 Å; and
step (c) comprises forming said layer of nitrogen-doped ta-C:N at a thickness from about 5 to about 20 Å.
8. (Withdrawn): The method according to claim 5, wherein:
steps (b) and (c) together form a layer of said hard, dense, and abrasion and corrosion resistant material having a combined thickness from about 10 to about 50 Å.

9. (Currently Amended): A recording medium, comprising:

- (a) a substrate having at least one surface;
- (b) a stacked plurality of thin film layers on said at least one surface thereof, said layers including at least one magnetic or magneto-optical (MO) recording layer; and
- (c) a protective overcoat layer on an outer surface of an outermost layer of said stacked plurality of thin film layers, wherein said protective overcoat layer comprises:
 - (i) a first sub-layer layer (c_1) of undoped tetrahedral amorphous carbon (ta-C) on said outer surface of said outermost layer of said stacked plurality of thin film layers and having a high mass density of carbon (C) atoms greater than about 2.5 gms/cm^3 ; and
 - (ii) a second sub-layer (c_2) of nitrogen-doped tetrahedral amorphous carbon (ta-C:N) on said undoped ta-C layer and having a high mass density of carbon (C) atoms greater than about 2.0 gms/cm^3 .

10. (Original): The recording medium as in claim 9, wherein:

said second sub-layer (c_2) of ta-C:N has a nitrogen-to-carbon atom ratio (N/C) of up to about 0.3.

11. (Original): The recording medium as in claim 10, wherein:

said first sub-layer (c_1) of undoped ta-C has a thickness from about 1 to about 100 \AA ; and said second sub-layer (c_2) has a thickness from about 1 to about 50 \AA .

12. (Original): The recording medium as in claim 11, wherein:

said first sub-layer (c_1) of undoped ta-C has a thickness from about 5 to about 30 \AA ; and said second sub-layer (c_2) has a thickness from about 5 to about 20 \AA .

13. (Original): The recording medium as in claim 10, wherein:

said protective overcoat layer (c) has a combined thickness of said first and second sub-layers ($c_1 + c_2$) from about 10 to about 50 Å.

14. (Withdrawn - Currently Amended): A hard, dense, and abrasion and corrosion resistant material useful in forming a protective overcoat layer for a magnetic or magneto-optical recording medium, which material comprises:

(a) a first region of undoped tetrahedral amorphous carbon (ta-C) having a high mass density of carbon (C) atoms greater than about 2.5 gms/cm³; and

(b) a second region of nitrogen-doped tetrahedral amorphous carbon (ta-C:N) having a high mass density of carbon (C) atoms greater than about 2.0 gms/cm³.

15. (Withdrawn): The material according to claim 14, wherein the nitrogen-to-carbon ratio (N/C) of said second region is up to about 0.3.

16. (Withdrawn): The material according to claim 15, wherein:

said first region forms a first sub-layer; and

said second region forms a second sub-layer stacked on said first sub-layer.

17. (Withdrawn): The material according to claim 16, wherein:

said first sub-layer is from about 1 to about 100 Å thick; and

said second sub-layer is from about 1 to about 50 Å thick.

18. (Withdrawn): The material according to claim 17, wherein:

said first sub-layer is from about 5 to about 30 Å thick; and

said second sub-layer is from about 5 to about 20 Å thick.

19. (Withdrawn): The material according to claim 16, wherein:

said first and second sub-layers have a combined thickness from about 10 to about 50 Å.

20. (Currently Amended): A recording medium comprising a stack of thin film layers on a substrate and a protective overcoat layer formed of ~~the material according to claim 16 with a~~ hard, dense, and abrasion and corrosion resistant material, which material comprises:

- (a) a first region of undoped tetrahedral amorphous carbon (ta-C) having a high mass density of carbon (C) atoms greater than about 2.5 gms/cm³; and
- (b) a second region of nitrogen-doped tetrahedral amorphous carbon (ta-C:N) having a high mass density of carbon (C) atoms greater than 2.0 gms/cm³;
wherein the nitrogen-to-carbon ratio (N/C) of said second region is up to about 0.3,
said first region forms a first sub-layer, and
said second region forms a second sub-layer stacked on said first sub-layer; and
said first sub-layer is formed in contact with an outermost layer of said stack.